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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/037,097	12/31/2001	John D. Puterbaugh	28891-101	5874

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EXAMINER	
LERNER, MARTIN	

ART UNIT	PAPER NUMBER
2654	

DATE MAILED: 03/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/037,097	PUTERBAUGH ET AL.	
	Examiner	Art Unit	
	Martin Lerner	2654	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 to 70* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10,22,23,25,27,30,40-46,51,52,55,58,60 and 68* is/are rejected.

7)☒ Claim(s) *11-21,24,26,28,29,31-39,47-50,53,54,56,57,59,61-67,69 and 70* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4/12/02 & 12/31/01*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested:

Translating a Monophonic Audio Sequence into a Tone Sequence

2. The disclosure is objected to because of the following informalities:

On page 6, ¶ 8, change "must" to –most—.

On page 11, ¶ 32, change "a analog-to-digital" to –an analog-to-digital—.

On page 16, ¶ 43, change "is defined" to –is defined as a—.

On page 16, ¶ 44, change "for based on" to –based on—.

On page 20, ¶ 50, there is no label in the text for Equation 7.

On page 23, ¶ 58, Statistical Processing Stage 203 and Pitch Quantization Stage 204 are reversed in Figure 5.

On page 27, ¶ 65, speaker driver 418 and speaker 420 are reversed in Figure 7.

On page 27, ¶ 66, application programs 50 are not illustrated in Figures 1 and 7.

Appropriate correction is required.

Claim Objections

3. Claim 16 is objected to because of the following informalities:

In claim 16, line 2, "ceptstral" should be –cepstral--. Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1 to 4, 7, 9 to 10, 22 to 23, 25, 27, 30, 40, 42 to 46, 51 to 52, 55, 58, 60, and 68 are rejected under 35 U.S.C. 102(e) as being anticipated by *Tolonen et al.*

Regarding independent claims 1, 2, and 40, *Tolonen et al.* discloses a method and apparatus for generation of a note-based code, comprising:

"accepting as an input a monophonic voice signal of limited duration" – audio input representing a musical presentation is received (column 4, lines 39 to 41: Figure 1A: Step 11); the audio signal may be produced for example by singing, humming, whistling or playing an instrument (column 4, lines 15 to 19); unless specified as stereo, singing is monophonic;

"translating said monophonic audio signal to a representation of a series of discrete tones" – audio-to-note conversion is applied to the audio input for generated note-based code; audio-to-note conversion comprises fundamental frequency

estimation and note detection (column 4, lines 41 to 46: Figure 1A: Step 12); fundamental frequencies are quantized, i.e. converted for example into a MIDI pitch scale, which effectively quantizes the fundamental frequency values into a semitone scale (column 2, lines 53 to 57); in voiced (harmonic) tones, the period of the excitation signal determines the fundamental frequency of the tone (column 6, lines 20 to 30);

"producing a control signal from said representation of discrete tones, control signal suitable for causing a transponder to generate a signal" – the code sequence ("a control signal") produced by the composition method is used for controlling an electronic musical instrument or synthesizer ("a transponder") for producing synthesized sound; the code sequence may be stored as a MIDI file (column 4, lines 52 to 58: Figure 1A: Steps 14 and 15);

"where said generated signal is human-recognizable as a translation of said monophonic audio signal" – implicitly, a MIDI file is "human-recognizable as a translation" of the audio input signal.

Regarding claims 3 and 4, *Tolonen et al.* discloses a MIDI file, which is "melodically human-recognizable" and "rhythmically human-recognizable".

Regarding claim 7, *Tolonen et al.* discloses the musical presentation is inputted by microphone 2 connected to computer host 3 (column 4, line 63 to column 5, line 4: Figure 1B).

Regarding claim 9, *Tolonen et al.* discloses the code sequence produced by the composition method is used for controlling an electronic musical instrument or synthesizer for producing synthesized sound (column 4, lines 52 to 58: Figure 1A: Step

14); thus, the code sequence must be "transmitted" to the electronic musical instrument or synthesizer.

Regarding claim 10, *Tolonen et al.* discloses:

"generating a digital representation of said voice signal" – the audio signal is digitized with an A/D converter if the audio input is not already in digital form (column 5, lines 30 to 34: Figure 2);

"dividing said digitized signal into a plurality of frames" – an audio input is segmented into frames in time (column 5, lines 26 to 30: Figure 2);

"extracting analysis data from each said frame" – the fundamental frequency of each frame is estimated (column 5, lines 28 to 30: Figure 2: Step 21);

"formatting said analysis data into a frame" – the code sequence may be stored as a MIDI file, which has a frame format, implicitly (column 4, lines 52 to 58: Figure 1A: Steps 14 and 15).

Regarding claims 22, 23, 25, 27, 30, 52, 55, and 58, *Tolonen et al.* discloses audio-to-note conversion involves investigating an energy-based signal level ("energy"), voicing ("spectral composition"), and a fundamental frequency ("pitch") for each frame to determine note-on ("a start frame") or note-off ("an end frame") events (column 9, line 23 to column 10, line 3: Figure 9: Steps 90, 92, and 94); note-on and note-off events define candidate regions for each valid note start frame and stop frame.

Regarding claim 42, *Tolonen et al.* discloses the audio signal is digitized with an A/D converter if the audio input is not already in digital form (column 5, lines 30 to 34: Figure 2).

Regarding claim 43, *Tolonen et al.* discloses the audio signal may be stored in a file and then output from a computer storage medium, such as a floppy disk or CD (column 4, lines 15 to 19; column 4, lines 55 to 60).

Regarding claim 44, *Tolonen et al.* discloses the fundamental frequency of each frame is estimated (column 5, lines 28 to 30: Figure 2: Step 21); fundamental frequency is a "time-varying feature of the input signal."

Regarding claim 45, *Tolonen et al.* discloses audio-to-note conversion involves investigating an energy-based signal level ("energy of said input"), voicing, and a fundamental frequency ("pitch assignment module") for each frame to determine note-on or note-off events (column 9, line 23 to column 10, line 3: Figure 9: Steps 90, 92, and 94); note-on and note-off events define "a segmentation module".

Regarding claim 46, *Tolonen et al.* discloses audio-to-note conversion involves investigating an energy-based signal level ("a primary feature module"), voicing ("a secondary feature module"), and fundamental frequency ("a tertiary feature module") for each frame to determine note-on or note-off events (column 9, line 23 to column 10, line 3: Figure 9: Steps 90, 92, and 94).

Regarding claim 51, *Tolonen et al.* discloses audio-to-note conversion involves investigating an energy-based signal level ("a first-phase segmentation module") and voicing ("a second-phase segmentation module") for each frame to determine note-on or note-off events (column 9, line 23 to column 10, line 3: Figure 9: Steps 90, 92, and 94).

Regarding claim 60 and 68, *Tolonen et al.* discloses fundamental frequency is first estimated by autocorrelation ("intranote pitch assignment") (column 6, lines 12 to 16: Figure 3: Step 32) and then a present fundamental frequency is compared to a previous fundamental frequency ("internote pitch assignment") (column 8, lines 41 to 65: Figure 7B: Step 78).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 5, 6, 8, and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Tolonen et al.* in view of *Theimer.*

Tolonen et al. omits accepting the voice signal over a wireless telephone connection, from an analog telephone receiver, or translating to tones within the capability of a mobile telephone audio output synthesizer. However, *Theimer* teaches recognizing and selecting a tone sequence for a piece of music in the same field of endeavor, where a user terminal is a mobile telephone and a user enters a tone sequence transmitted to a database for output at the user terminal. (Column 2, Lines 48 to 59) The note sequence associated with a piece of music may be in a MIDI format. (Column 4, Lines 36 to 50) A user enters a passage of the piece of music by simply singing the melody known to him into the microphone of his mobile telephone, a

transceiver unit sends the music to a music database, and converts the passage to a series of tones. (Column 4, Line 66 to Column 5, Line 50; Column 6, Line 60 to Column 7, Line 3) Although *Theimer* does not specifically mention an analog telephone receiver, it is an obvious expedient given a teaching of a mobile telephone and that *Tolonen et al.* teaches A/D conversion "if the audio is not already in digital form" (column 5, lines 30 to 34). The objective is to permit a user to find and select a tone sequence or piece of music whose title he does not know from a mobile telephone. (Column 1, Lines 46 to 59) It would have been obvious to one having ordinary skill in the art to perform generation of a note-based code of *Tolonen et al.* over a wireless telephone connection or from an analog telephone receiver for translating tones within the capability of a mobile audio output synthesizer as taught by *Theimer* for the purpose of permitting a user to find and select a tone sequence or piece of music whose title he does not know.

Allowable Subject Matter

8. Claims 11 to 21, 24, 26, 28 to 29, 31 to 39, 47 to 50, 53 to 54, 56 to 57, 59, 61 to 67, and 69 to 70 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to Applicants' disclosure.

Zhang, Laurila et al., Fanty et al., Hermansky et al., and Szalay disclose related art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin Lerner whose telephone number is (703) 308-9064. The examiner can normally be reached on 8:30 AM to 6:00 PM Monday to Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on (703) 305-9645. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ML
2/28/05

Martin Lerner
Examiner
Group Art Unit 2654